

CLAIMS

1. A substrate processing apparatus having a processing chamber which accommodates a substrate or substrates therein, and a heating member which heats said substrate or substrates, in which at least two gases which react with each other are alternately supplied into said processing chamber to form a desired film or films on a surface or surfaces of said substrate or substrates, characterized by comprising:

two supply tubes through which said two gases respectively flow independently from each other; and

a single gas supply member which supplies said gases into said processing chamber and which has a portion extending to a region whose temperature is equal to or higher than a decomposition temperature of at least one of said two gases, wherein

said two supply tubes are connected to said gas supply member at a location whose temperature is lower than the decomposition temperature of said at least one gas, and said two gases are supplied into said processing chamber through said gas supply member.

2. A substrate processing apparatus as recited in claim 1, characterized in that

said gas supply member is a nozzle having a large number of gas injection openings.

3. A substrate processing apparatus as recited in claim 2, characterized by further comprising:

a reaction tube which forms said processing chamber and which can accommodate a plurality of stacked substrates therein, wherein

said nozzle extends from a lower portion to an upper portion of said reaction tube along a direction in which said substrates are stacked.

4. A substrate processing apparatus as recited in claim 1, characterized in that

said two supply tubes and said gas supply member are connected to each other in said processing chamber.

5. A substrate processing apparatus as recited in claim 1, characterized in that

a film produced by reaction of said at least two gases is adhered to an inner wall of said gas supply member.

6. A substrate processing apparatus as recited in claim 5, characterized in that

cleaning gas is supplied into said processing chamber through said gas supply member to carry out a cleaning operation of said processing chamber and a removing operation of said film adhered to said gas supply member.

7. A substrate processing apparatus as recited in claim 1, characterized in that

said gases are trimethyl aluminum and ozone, and an aluminum oxide film or films are formed on a surface or surfaces of said substrate or substrates.

8. A substrate processing apparatus as recited in claim 1, characterized in that

said gases are tetrakis (N-ethyl-N-methyl amino) hafnium and ozone, and a hafnium oxide film or films are formed on a surface or surfaces of said substrate or substrates.

9. A substrate processing apparatus comprising a hot wall type processing furnace which includes a processing chamber which accommodates a substrate or substrates therein and a heating member which is disposed outside of said processing chamber and which heats said substrate or substrates, wherein at least two gases which react with each other are alternately supplied into said processing chamber to produce

a desired film or films on a surface or surfaces of said substrate or substrates, characterized by comprising:

two supply tubes through which said two gases respectively flow independently from each other; and

a single gas supply member which supplies said gases into said processing chamber, and which has a portion disposed inside of said heating member, wherein

said two supply tubes are connected to said gas supply member in a region whose temperature is lower than a temperature in said processing chamber in the vicinity of said substrate or substrates, and said two gases are supplied into said processing chamber through said gas supply member.

10. A semiconductor device producing method characterized in that

using a substrate processing apparatus having a processing chamber which accommodates a substrate or substrates therein, and a heating member which heats said substrate or substrates, in which at least two gases which react with each other are alternately supplied into said processing chamber to form a desired film or films on a surface or surfaces of said substrate or substrates, comprising:

two supply tubes through which said two gases respectively flow independently from each other; and

a single gas supply member which supplies said gases into said processing chamber and which has a portion extending to a region whose temperature is equal to or higher than a decomposition temperature of at least one of said two gases, wherein

said two supply tubes are connected to said gas supply member at a location whose temperature is lower than the decomposition temperature of said at least one gas, and said two gases are supplied into said processing chamber through said gas supply member,

said two gases are alternately supplied into said processing chamber through said gas supply member to form said desired film or films on said surface or surfaces of said substrate or substrates.